

### **REMARKS**

Reconsideration and allowance of the present application are requested in light of the amendments above and the remarks that follow.

By this Amendment, claims 1 and 4 have been amended, and claims 8-10 added. Claims 1-10 are currently pending. The specification is also amended to correct minor informalities.

Support for the amendments may be found at least at the following locations of the original disclosure: page 5, lines 20-23; Figure 1; and the original claims.

### ***CLAIM OBJECTIONS***

Claims 1 and 2 stand objected to on the grounds set forth in paragraph 2 of the Official Action. By the present response, claims 1 and 4 have been amended in a manner which is believed to address the above-noted objection. Thus, reconsideration withdrawal of the objection is respectfully requested.

### ***CLAIM REJECTIONS - 35 USC § 102***

Claims 1-3 and 5-7 stand rejected under 35 USC 102 (e) as being anticipated by US patent number 6,686,658 to Kodama et al. (hereinafter "*Kodama et al.*") on the grounds set forth in paragraph for the official action. Reconsideration and withdrawal of the rejection is respectfully requested..

The present invention is directed to a power semiconductor module which represents an improvement over such devices occurring in the state of the art. In particular, as discussed on pages 2-3 of the present specification, conventional arrangements of this type are susceptible to a fixed material connection which may

be formed between a first main electrode and a foil or lamina which can be separated only by destruction of the first main electrode and thus of the semiconductor chip device. Another issue occurs when, due to different coefficient thermal expansion between the contact element and semiconductor chip, the electrode metallization can become detached over the course of time, thus also resulting in failure of the semiconductor device. Yet another problem associated with the state of the art is associated with the fact that semiconductor modules are not sealed in an airtight fashion. Conventional contact elements which are formed from aluminum are thus susceptible to the formation of an aluminum oxide film thereon. The aluminum oxide acts as an electrical insulator, and upon exposure to current generates heat, which may in turn destroy the power semiconductor module.

A power semiconductor module constructed according to the principles of the present invention is set forth in amended claim 1. Amended claim 1 recites:

1. *A power semiconductor module comprising*
  - *at least one semiconductor chip made of a semiconductor material and having first and a second main electrodes,*
  - *first and second main connections,*
  - *a contact lamina in electrical contact with the first main electrode and the first main connection,*
  - *the contact lamina containing an alloying partner capable of forming an eutectic between the alloying partner and the semiconductor material,*
  - *the contact lamina being coated with an electrically conductive protective layer,**wherein*
  - *the protective layer has at least one electrically conductive base layer applied on the contact lamina, and an electrically conductive surface layer, which forms an external contact area,*
  - *the base layer and the surface layer substantially comprise different materials, and*
  - *the surface layer is present between the contact lamina and the first main connection and between the contact lamina and the semiconductor chip.*

As evident from the above, claim 1 requires, *inter alia*, "the surface layer is present between the contact lamina and the first main connection and between the contact lamina and the semiconductor chip." The nickel-plated film 16 of Kodama et al. clearly fails to satisfy the above quoted aspect of amended claim 1. As disclosed, for example, on page 7 of the present specification, providing a surface layer as defined in amended claim 1 on the contact lamina provides the present invention with the advantage that it prevents an undesirable fusion between the semiconductor chip and the contact lamina. In *Kodama et al.*, the nickel-plated film 16 is not arranged between the semiconductor chip and the contact lamina. Therefore, the layers of *Kodama et al.* have an order and arrangement which does not correspond to the requirements set forth in amended claim 1.

In addition, as explicitly disclosed at column 9, lines 14-15 of *Kodama et al.*, the nickel-plated film 16 "is formed on the surface of the common electrode plate" (emphasis added). Thus, this nickel-plated film 16 does not coat anything equivalent to the contact lamina, as also required by amended claim 1.

Thus, for at least the noted above, *Kodama et al.* fails to anticipate the power semiconductor module specified in amended claim 1.

The remaining claims depend from claim 1. Thus, these claims are also distinguishable over *Kodama et al.* For the same noted above.

**NEW CLAIMS**

Newly presented claims 8-10 depend from claim 1. Thus, these claims are also distinguishable over the applied prior art for the same reason. In addition, claims 8-10 further define certain characteristics of the surface layer of the presently claimed invention.

**CONCLUSION**

From the foregoing, further and favorable action on the merits is respectfully requested. Should the examiner feel that any issues remain, is respectfully requested that the undersigned be contacted so that any such issues may be a quickly addressed and the prosecution of the innocent application expedited.

Respectfully submitted,

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